Undergraduate Student Research Project (USRP)

FY 2013 Annual Report (9/1/12 – 9/1/13)

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PROJECT DESCRIPTION

The NASA Undergraduate Student Research Project (USRP) offers students across the United States immersive research and engineering internship experiences at all ten NASA Field Centers and two NASA Research Facilities.

USRP interns work side-by-side with NASA engineers and scientists performing activities ranging from basic research and development to mission operations. At the completion of the internship session, students must submit a 10-page technical paper on their NASA-USRP internship experience. Students may also be asked to discuss their research in public forums and/or participate in NASA-sponsored colloquia, workshops and technology demonstrations.

USRP internships are open to U.S. Citizens with a cumulative GPA of 3.0, currently enrolled full-time in an undergraduate STEM degree program and classified as a sophomore or above by the start of the internship. In some cases, recently graduated students (less than 9 months) pursuing a STEM graduate degree are also eligible. Applicants must also be pursuing a STEM degree that aligns with NASA's critical core competency needs. Eligible fields of study are academic majors or demonstrated coursework concentration in engineering, mathematics, computer science or physical/life sciences.

USRP internships occur in three sessions. Participants receive a $6,500 (10-week summer session) or $9,500 (15-week spring or fall session) stipend for the research experience. A location allowance may be provided for USRP students at specific high cost NASA Centers.

PROJECT GOALS

The purpose of USRP is three fold:

1) To extend and strengthen NASA’s commitment to educational excellence and university research, highlighting the critical need to increase the Nation’s undergraduate and graduate science, engineering, mathematics, and technology (STEM) skill base

2) To build a national NASA STEM education pipeline - from existing NASA K-12 STEM education program activities to NASA Higher Education Program options — that encourage and facilitate student interest in future professional opportunities with NASA and its partner organizations

3) To attract STEM undergraduate students from the widest array of backgrounds, who are fully representative of America’s racial, ethnic, and

cultural diversity and to provide them with hands-on, challenging research experiences that stimulate continued student interest in the fields/disciplines aligned with NASA's research and development mission.

PROJECT BENEFIT TO OUTCOMES 1 AND 2

USRP is a fully-immersive experiential program for higher education STEM students providing experiences spring, summer, and fall. Research shows that one of the best methods of maximizing retention within a field of study is to incorporate experiential opportunities into the traditional course of study. Benefits in terms of retention to graduation, increased capability at graduation, pursuit of advanced degrees, and retention within the career field are well documented.

As such, USRP directly addresses NASA Higher Education Outcome 1 and supports NASA Higher Education Outcome 2 of the NASA Education Strategic Plan. These outcomes commit the education office to fund programs which:

(1) "*contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals through a portfolio of investments"* and

(2) *"attract and retain students in STEM disciplines through a progression of educational opportunities for students…..*"

USRP most directly contributes to NASA Higher Education Outcome 1.2:

> *"Provide NASA competency-building education and research opportunities to individuals to develop qualified undergraduate and graduate students who are prepared for employment in STEM disciplines at NASA, industry, and higher education."*

To document retention outcomes, longitudinal data was collected from 2008-2011. Of the 327 USRP alumni respondents, 100% achieved their STEM Bachelor Degree, 52% choose to pursue a graduate STEM degree after graduation, and 95% of the rest successfully entered the STEM workforce. In all, 97% of the USRP alumni surveyed remained in the STEM pipeline either as students or professionals.

To document project impact on professional competencies, participant surveys were conducted from 2008-2011. Students were asked if their USRP experience allowed them to grow their capabilities in key professional categories. Based on 991 responses, USRP experiences provided growth in professional communication skills (98%), conceptual and analytical thinking (99%), and in applying knowledge of their field (98%).

Finally, USRP participants (991 data points) were asked if the experiences increased their professional self-confidence (94% agreed), increased their academic motivation (96%), and their commitment to pursue a STEM career (95%).

Based on the data collected from participant surveys and longitudinal studies, USRP appears to contribute significantly to Higher Education Outcomes 1 & 2.

Further details can be found in the references provided at the end of this document.

PROJECT FY '13 ACCOMPLISHMENTS

In FY13 two-hundred and seventy students were selected to participate in USRP – an increase of 130 from the previous year. This increase resulted from the decision to reinstitute HQ funding and employ USRP as a transitional vehicle for implementing internships within the new NIFS (NASA Internships, Fellowships, and Scholarships) line of business in FY13. In FY14 USRP will be closed out and a new "NASA Internships" project launched.

Distribution of USRP interns at each NASA center are shown in the table below.

NASA Center	# of Students			Total
	Fall	Spring	Summer	
	2012	2013	2013	
Ames	3	10	12	25
Dryden	1	3	14	18
Glenn	4	13	14	31
Goddard	3	9	12	24
Headquarters	1	1	1	3
JPL	6	12	18	36
JSC	2	12	27	41
KSC	3	6	8	17
Langley	3	6	9	18
Marshall	3	13	17	33
Stennis	0	3	6	9
Wallops	0	3	5	8
White Sands	0	0	7	7
Total	29	91	150	270

Participant Demographics

The USRP sought to select an institutionally diverse group of interns from a wide array of backgrounds, who are fully representative of U.S. undergraduate students enrolled in STEM majors.

In FY13, the 270 interns represented 151 academic institutions, 40 states, the District of Columbia and Puerto Rico.

- 33% were female and 63% were male (identical to FY '12)
- 33% were from underrepresented groups (up 14% from FY'12)
- 15% were underclassmen, 82% were upperclassmen, 3% were graduate
- 26% were from Minority Serving Institutions including:
  - 3 from AIANE institutions *(American Indian & Alaska Native Education)*
  - 25 from HBCU's *(Historically Black Colleges & Universities)*
  - 44 from HSI's *(Hispanic Serving Institutions)*
  - 26 from AANAPISI's *(Asian American & Native American Pacific Islander Serving Institutions)*

IMPROVEMENTS MADE IN THE PAST YEAR

USRP was able to pilot some of the processes that will be implemented under the new NIFS line of business in FY'14.

MINORITY UNIVERSITY RESEARCH AND EDUCATION PROJECT (MUREP)

In FY 13, USRP partnered with NASA's Minority University Research and Education Project (MUREP) to receive an additional $300,000 for summer interns from attending Minority Serving Institutions (MSIs) MUREP enhances the research, academic, and technology capabilities of Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), Tribal Colleges and Universities (TCUs), Asian American and Native American Pacific Islander-Serving Institutions (AANAPISIs), and other MSIs. Participation in NASA projects and research stimulates increasing numbers of learners to continue and complete their studies at all education levels and encourages students to earn advanced degrees in STEM fields critical to NASA and the Nation.

In total, the MUREP funding generated 36 summer internships with participants representing 25 institutions. In addition, the total number of USRP participants from MSI's increased from 29 out of 181(16%) in summer of 2011 to 66 out of 150 (44%) in 2013 showing that the infusion of funding generated additional opportunities for MSI students. (Note: In 2012 there were no Headquarters funded USRP interns.)

PROJECT PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

Universities Space Research Association (USRA) provides program management, implementation and administration of the NASA Undergraduate Student Research Project (USRP) for NASA Johnson Space Center (JSC).

In FY13, USRP continued its partnerships with University of Texas Pan American (UTPA and HESTEC), American Association of Community Colleges, NASA Space Grant and Universities Space Research Association Council of 104 Space-related Institutions. USRP expanded its partnerships to include the Tribal Working Group and American Society of Engineering Educators (ASEE). USRP also continued working with the NASA OSSI Broker Facilitator organizations in their efforts to recruit potential STEM intern applicants. The goal of these targeted partnerships (and others to follow) is to widen the USRP opportunity dissemination points resulting in a larger, more diverse pool of highly qualified participants.

References:

B. E. Dansberry, Examining Outcomes Data From an Undergraduate Internship Program, ASEE Annual Conference Proceedings (AC 2012-4594), June, 2012.
H. Ogletree; A. Zippay, Employing Strategic Communications to Accomplish Outreach Goals For Experiential Programs, ASEE Annual Conference Proceedings (AC 2012-4752), June, 2012